State of California
Department of Food and Agriculture
Division of Measurement Standards

Certificate Number: 5110-00

California Type Evaluation Program
Certificate of Approval
for Water Meters

For:

Water Meter
Positive Displacement - Nutating Disc
Models: SM20, SM25, SM40, Model 25 & 40 Series
Sizes: 5/8", 3/4" and 1"
Max. Flow Rate: See Table on Page 2
Min. Flow Rate: See Table on Page 2
Minimum Increment: See Table on Page 2

Submitted by:

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Standard Features and Options

Unit of measure: Gallons and Cubic Feet

Water meter components:

Magnetic ceramic drive register with sealable lens covering
Thermoplastic measuring chamber with thermoplastic marble plate
External threaded pipe connections
Thermoplastic strainer
Thermoplastic plated measuring chamber

Option: Electronic pulse output (not evaluated)

NOTE: Approved for use when installed in a "**HORIZONTAL**" and "**VERTICAL**" position according to the manufacturer's instructions only

These devices are to be installed where they are protected from excessive heat and freezing conditions

This device was evaluated under the California Type Evaluation Program (CTEP) and was found to comply with the applicable technical requirements of California Code of Regulations for "Weighing and Measuring Devices." Evaluation results and device characteristics necessary for inspection and use in commerce are on the following pages.

Effective Date: December 15, 2000

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Mike Cleary, Director

Badger Meter
Water Meter
Models: SM20, SM25, SM40, Model 25 and 40 Series

Model	Register Style	Flow Rate (gpm)	Unit of Measure	Minimum Increment
SM20	Recordall	1/2 to 15	Gallons	0.1 gal
	Digital Submeter Interface			
	DSI-1L (digital submeter interface - 1 lobe cam)		Cubic Feet	0.01 cu ft
	Read-O-Matic			
Model 25	Recordall	1/4 to 15	Gallons	0.01 gal
	Recordall Transmitter Register			
	Read-O-Matic			
SM25	Digital Submeter Interface	1/2 to 25	Cubic Feet	0.01 cu ft
	DSI-1L (digital submeter interface - 1 lobe cam)			
Model 40	Recordall	3/4 to 40	Gallons	0.1 gal
	Recordall Transmitter Register			
	Read-O-Matic			
SM40	Digital Submeter Interface		Cubic Feet	0.01 cu ft
	DSI-1L (digital submeter interface - 1 lobe cam)			

NOTE: Remote readout capability was not evaluated. Additionally, the measuring chamber is stamped either with 20, 25 or 40. Each number indicates the measuring chamber is designed for a specific model register. (Example: A number 25 on the measuring chamber is only applicable for the Model SM25 and Model 25.)

Application: Approved for use as a domestic cold-water meter only when installed in a "**HORIZONTAL**" and "**VERTICAL**" position. The flow direction indications are cast into the single pipe connector, main case.

NOTE: Written installation instructions shall be included with each meter. Additionally, field installations should be verified according to the manufacturer's installation requirements.

Identification: The manufacturer's name and model designation are silk-screened on the register's indicating face. The serial number prefaced with "S/N" is hot stamped on the measuring chamber.

Sealing: The water meter can be sealed with a wire security seal threaded through a drilled bolt head on the side of the register locking cap to holes on the locking ring on the bottom of the measuring chamber.

Operation: The water meter utilizes a positive displacement nutating disc with strainer, magnetically driven register, and pipe connection with external thread. Water flows through the meter's strainer and into the measuring chamber where it causes the disc to nutate. The disc nutates on its own ball, guided by a thrust roller. A drive magnet transmits the motion of the disc to a follower magnet located within the permanently sealed register. The follower magnet is connected to the register gear train. The gear train translates the disc nutations into volume totalization units displayed on the register dial face. Water flow should be free of foreign material that may become lodged in the meter's inlet screen and affect its accuracy. Additionally, the water meter may be equipped with an electronic pulse output for interface with a remote meter reading system. The magnetic sensor output was not evaluated.

Test Conditions: The Models SM20, SM25, SM40, Model 25 and Model 40 with various register configurations were submitted for evaluation. The emphasis of the evaluation was on the device design, marking requirements, and performance. The devices were tested with normal, intermediate, and minimum flow rates; and with various register configurations. After a successful initial flow rate test, a permanence test was conducted which consisted of approximately 160 000 gallons of throughput (recirculation) over 60 days. The meters were retested at the normal, intermediate, and minimum flow rate.

Results of the evaluation indicate the devices comply with applicable requirements.

Type Evaluation Criteria Used: Title 4, California Code of Regulations, 2000 Edition

Tested By: Sam Chan (CA) and Dan Reiswig (CA)